THE PLEASURE OF TOUCH

A SUGGESTED CORRELATION BETWEEN THE CHANGE OF THE SURFACE OF CELL MEMBRANES AND THE EFFECTIVENESS OF BODYWORK METHODS

Bernhard Schlage

Bernhard Schlage has hosted workshops for over 35 years across Europe and has run a private body psychotherapy practice since 1984. He has lectured at international congresses in San Francisco, Paris and Sydney. In 1986, he co-founded a mental health center, and ran it for 22 years. Since 1999, he has been a Postural Integration trainer, and since 2001, has been an ECP holder. Specializing in treating psychosomatic disorders, his work is now focused on training the next generation of health care practitioners in body psychotherapy. Bernhard is author of more than 100 articles about body psychotherapy and has published four books. Contact: post@bernhardschlage.de

Abstract

This article's main focus is to explore the idea that the thixotropic quality of the extracellular substance is responsible for the effects brought about by professional touch. In order to bring together experiences of the effect of bodywork and late findings in biochemistry, this article begins by addressing thixotropic1 qualities of connective tissue, the extracellular substance of the body which Ida P. Rolf described as 'The organ of our structure',” (Rolf, I., 1978). This is similar to Wilhelm Reich's understanding of the correlation between the biophysical charge of tissue and the emotional state of a person. The article includes the work of Jack Painter (2011) who pointed out that a certain tissue quality and a dominant character type often coincide.

This model has become an effective instrument in diagnosis and in developing effective bodywork techniques. The latest relevant findings of biochemistry by Heine (1997) and Pischinger (2010) are also explored in search for an explanation of those experiences reported by clients following bodywork treatment.

1 The property exhibited by certain gels of becoming fluid when stirred or shaken and returning to the semisolid state upon standing. The word comes from Ancient Greek θίξις thixis "touch" (from thinganein "to touch") and -tropy, -tropous, from Ancient Greek -τρόπος -tropos "of turning", from τρόπος tropos "a turn", from τρέπειν trepein, "to turn".

The fluid nature of our connected tissue

He was a cameraman, filming the leg musculature of a turkey. Each single coating of the muscles was lifted with a pair of pincers as the structures were filmed. One could see threadlike structures, surrounded by moisture, stretched out in three dimensions; sliding, netlike structures that were capable of changing their form completely depending on the tension applied to them. They were capable of stretching or thickening; of changing the structures of the three-dimensional net; of shifting the base angle of single fibers and thereby modulating the effective leverage. It was impossible to see this as anything but an entire semi-fluid system, adapting itself to changing conditions.

Several questions arose regarding what might happen to this cellular structure if it was damaged by external influences.

(1) How would it change if it were suddenly hit or pushed, compressed by shock; would it react by thickening and tightening?

(2) Would the ability of the tissue to give support, and would the form be altered with nutritional changes?

(3) How might it be altered during an operation on deep tissue and how might it attempt to regain form afterwards?

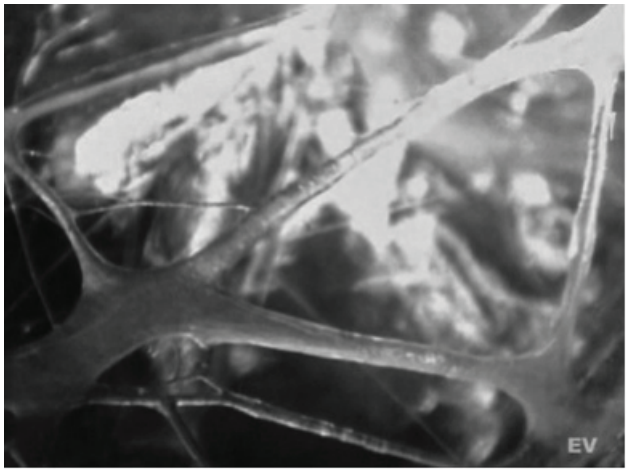

Figure 1, Semi-fluid system responding to environment, (Guimberteau, 2010)

While watching the filming process, I began to think about how all the kneading, pressing, and pushing during manual therapy is light years away from an appropriate handling of this basic structure of fascia in our body.

The extracellular substance of our tissues is permeated by fascial structures; they are found between the surface of the skin and the muscles, among the single fibrils inside the muscles, around the organs, in the depth of the calves, as well as around the ovaries of a woman. Francesco Varela, a well known systemic biologist, stated if one would extract from a cat all of its bones, organs, and muscle tissue so that merely the fascia were left, we would still see the complete form of the body of the animal before us (Varela, 1987, p. 72-73). Tom Myers describes how this test is also currently being done on human bodies (Myers, 2001). Ahead of her time, Ida Rolf liked to refer these fascia as 'the organ of our structure' (Rolf, 1978, p. 34).

I have no objections whatsoever to manual therapies for wellbeing, and enjoy many kinds of nourishing touch. Yet, watching the film, I realized how many of our theories of treating muscular tension and pain have little in common with the reality of that which is being treated, and I felt an increasing interest in these fascial structures. Fascia is ubiquitous, providing a framework to our physical structure on every level from our outer covering to the cellular structures deep within. In order to understand the wonderful, positive effects of Structural Integration, we have to understand how fascia functions.

The earliest obtainable information concerning these basic tissue structures in relation to manual therapy is found in James Oschman's (1986) examinations of the gel-/sol-structure (Oschman, 1986) of connective tissue. He describes how, under certain conditions, the extracellular substance is capable of hardening and tightening, yet when touched and warmed with gently increasing pressure (i.e., by the hand of the therapist), it can liquefy and loosen again (Oschman, 1986). In my own experience, Structural Integration recipients

have repeatedly described the experience of incredible physical relief as well as increased emotional wellbeing.

In the same period as Oschman's 1986 studies, Milton Trager (see Juhan, 1987) developed methods of treatment which provided similar benefits to the joints. Additionally, Deane Juhan describes developed methods of treatment that allowed the area of the joints to benefit by these effects as well. (Juhan, 1987). Fascial plasticity is the topic of the dissertation of Robert Schleip (2006). He extracted segments of human and animal fascia and, under in-vivo conditions, proved that these structures are capable of changing their forms by movements (contraction and elongation, thickening and elasticity) independently of innervations (Schleip, 2006).

Recognition by touching

Reich used qualities of touch in his work not with the goal to mechanically loosen or soften tissue, but instead, to make conscious the feelings, experiences, and memories of the client. In his earliest remarks concerning this methodology, Reich used terms from the nervous system and differentiated between the charged nature of the sympathetic and parasympathetic tissues. He theorized that treatment techniques have to be adjusted in relation to the state of the vegetative nervous system. However, the deeper Reich delved into the exploration of what he names 'biones'2 , the more clearly he developed a terminology that spoke of 'cell charge' and of calcium/sodium balance within the charge of the cell membrane in the extracellular substance' (Reich, 1948, p. 216). Later, this theory was developed further in the work of Erich Jantsch (1982).

2 The bione-experiments done in 1939 showed that in the process of decomposition from biological materials, small bubbles could be seen under the microscope. They already have a membrane and a fluid intent and have a tendency to create higher structural molecules. Reich, W. (1948). The cancer biopathy. Orgone Institute Press. Chapter II

Lowen, (2005) and Boyesen (1987), (searching for the source of the charge/energy in the body of their clients), developed ways of utilizing tissue work described as 'de-armoring' or 'liberation,' which focus on the change of the cell membrane charge during emotional expression.

In his later work, Reich began to realize the source of the energies of the body, which he now named 'orgone' (Reich, 1973), could be found in earth's. Although his contemporaries found it difficult to comprehend Reich's research on the influences of weather and the 'atmospheric orgone', and without being aware of it himself, Reich developed a theory similar to the Asian idea of chi. (Sharaf, 1983) In his later work (Reich, W., 1954), one can find the understanding that this chi cannot be awakened within the person; instead, one has to make the person receptive to atmospheric chi (Hei, 1990, p. 54).

Multi-dimensional nature of emotional intelligence

Reich's groundbreaking work reveled the correlation between a person's ability to express basic emotions and the alteration of the energetic charge of tissue areas – that extracellular substance which is at the core of interest in this article. To this day, his description of how character causes concentration of life energy in certain parts of the body, and the distinctive body-forms resulting from this. Serving as the foundation of the knowledge of human nature within humanistic psychology. Lowen (2005), Kurtz (1985, p. 298) and Dietrich (2007), among others, use the framework of his body typing as a basis for their elaboration of therapeutic strategies.

Today, Reich's emphasis on the release of emotional energy and his idea that by restoring the 'full orgiastic potency' (Reich, 1948, p. 76) all problems of life can be managed, can be looked upon in a new way. Since Ken Wilber's (2000) formulation of the 'four quadrants of life experience,' we know therapy has to take into consideration all quadrants, within all

levels, in order to succeed [3]. Reich's insight that it is necessary to provide adequate 'affect-motoric concepts' (Downing, 1972) to reach emotional release is a standard in internationally recognized curricula today for a training in bodywork4 . Daniel Goleman (1995) wrote bestsellers dealing with popular scientific neurological findings and their significance for the development of emotional expression and thereby for our emotional and social health (Goleman, 1995).

The basis of these diagnostic tools is the tissue types, according to Sheldon (1996), and his differentiation according to the development of each blastodermic layer during the growth of the embryo. Sheldon distinguishes between endomorph, mesomorph, and ectomorph tissue types; for example, people with a pronounced digestive tract, those with a pronounced muscle system, and those with a highly active nervous system (Sheldon, 1996).

Based on Sheldon's work, the pioneering work of Jack Painter (2011, p. 47) establishes the connection between the different tissue qualities of clients and their dominant character structure. During his 40 years of professional practice, Painter classified the manifold impressions of touch and passed on to his students the knowledge of how it is possible to draw conclusions from the quality of the tissue to the main psychic conflicts and then create a very efficient path of psychotherapeutic treatment.

These examples show the importance the phenotype of tissue has upon the body-psychotherapeutic treatment, however, they give little insight into the structure of the extracellular substance of the connective tissue itself. The latest knowledge concerning this connection comes mainly from two sources: Hartmut Heine's work about the fundamental regulation of the extra cellular matrix (Heine, 1997), and the work by Alfred Pischinger and his students about the 'system of fundamental regulation' (Pischinger, 2010). Let us make an attempt, as non-biochemists, to find our way into the world of these researchers.

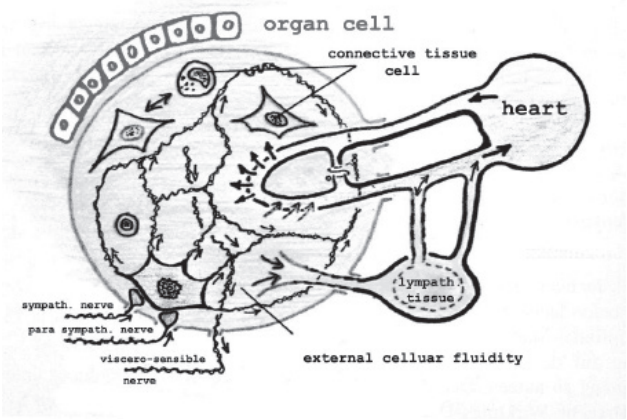

Figure 2, Illustration of ground regulation
Pischinger, 2010, p. 18, Used with Permission

The mechanical bed of our sensations

Starting with Hippocrates' idea that the problem with disease is not the pathogen but the surrounding tissue and the reaction of the immune system (Diller, H., 1932), Pischinger began his research into the extracellular substance of human connective tissue in the 1980s in Austria. He quickly discovered that each single cell, be it a muscle, nerve or organ cell, exists in an environment of fluid substance. The ability of each cell to fulfill its function within the organism depends very much upon the structure of this extracellular substance. Pischinger calls this the functional unit of the cell and extracellular space (Pischinger, 2010, p. 18).

The nutrients transported by blood vessels and penetrating into surrounding tissue (the lymphatic tissue stream), the vegetative nervous signal currents, and connective tissue cells, form a functional unit. Its mode of functioning is determined by the state of the extracellular matrix. Pischinger named this triad 'the system of basic regulation' (Pischinger, 2010, p. 12). To know more about how bodywork influences the tissue structures altering the form, especially how the so-called 'gel to sol' (Oschman, 1986) change of the connective tissue (thixotropy) comes about, we have to concern ourselves with the system of basic regulation.
Let us have a look at the conclusion we may draw from Pischinger's research for the present models.

3 The Intentional Self, The Behavioral Self, The Collective Self, The Cultural Self (Wilber, 2000)
4 http://www.eabp.org

Each and every muscle in the body we touch is embedded deeply in a liquid bed of extracellular substance. This is true for the muscle as a whole and for each of its fibrils. Let us recall the picture of Guimberteau's film at the beginning of this article: our touching can be oriented toward this basic fluid structure, rather than the mechanical-physical models of leverage.

The charge states of cell membranes in muscles, nerves and connective tissue allow an understanding of an electromagnetic regulatory principle within the treated tissue areas (Reich, 1948, p. 216). Heine's understanding of 'electrochemical sluice gates' (Heine, 1997, p. 216), Pischinger's 'bioelectrical appearances' in proving the effect of acupuncture, (Pischinger, 2010, p. 139), and Oschman's understanding of 'piezo-electrical charges within the liquid crystal of connective tissue' (Oschman, 2000) are astoundingly similar despite the differing paths of research.

This holds true for the local conditions of charge and discharge as well as for the stimuli transmission to central areas of the nervous system. Skin and connective tissue may be seen as the surface of the deep layers of our brain and memory that we are able to touch. Remember that each square centimeter of your skin holds about 700 nerve cell receptors. Each of them is directly connected to the autonomic nervous system and through that, to the brain. That means each part of your skin can remember what it has experienced and can relate this memory to the actual touch. (Deane Juhan, 1987, chapter II, "Skin as a surface of the brain")

These charge states may be influenced by modulating the quality of our touch (pressure, movement, speed) and by changing the charge of the whole organism; for instance, through movement, deep breathing, or expressions of emotion. Here I want to stress the point: structural work on the connective tissue is always linked to the whole of the body, its state and its' memories (Schleip, 2012; Rywerant, 1985, p. 82).
In my book, The Bodyworker's Wheel (Schlage, 2010), I explore how the effects of bodywork can be explained through different methods. I also include a logical differentiation between methods of treatment, including: a basic introduction to cosmic energy according to Traditional Chinese Medicine, working with the energetic charge of the cell membrane, work relating to the nervous stimuli transmission of emotion and memory, and working with the thixotropic effect.

The self-creating connective tissue

The connective tissue, as a 'dissipative structure' (Prigogine, 1998) is open for energetic changes, and, consequently, is capable of creating and recreating its own molecular key elements. This phenomenon has been well proven by the example of the fibroblasts: those cells that help build up the extracellular substance, which also change the quality and consistency of the basic molecular elements (Juhan, 1987, p. 82). They will, for instance, increase the deposit of minerals in tissue areas subject to great pull, to build stronger tendons. This is well known in the cases of ganglions at the wrist (i.e, bible bump) or the development of a ganglion in the tendon of the musculus gracilis at the medial part of the upper leg of cowboys. We also know the reverse from methods utilizing relaxation: along with the decrease of muscle tonus, the muscle itself may become more lithe due to an increased fluidity of the extracellular substance.

Until now, many bodyworkers have used the theory that the activity of fibroblasts in altering the extracellular substance was the primary mechanism leading to the perceptible slipping-gliding or melting changes in the tissue during a specific treatment (Schleip, 2012). Robert Schleip points out why this explanation of the thixotropic effect is no longer sufficient: the life cycle of fibroblasts is too slow to account for the immediately palpable change (Schleip, 2012). More provocatively, Paul Ingraham asks, if thixotropy happens through mechanical pressure and warmth, why doesn't it work while sitting in the sauna? (Ingraham, 2009). It has been shown that the thixotropic effect on the fascia in vitro happens for a couple of minutes and then reverses to its original state (Schleip, 2012). But our clients can sense this effect of relaxing the chronic hypertonic

tissue, or pain resulting from scars, in a couple of sessions, resulting in more relaxed and coordinated movement for hours and days. This difference between fascia reaction in vitro and in living clients has to be researched in future. It is this author's opinion that future research needs to focus on the role of sugar polymers in the extra cellular substance.

How sugar structures our tissue

From an evolutionary standpoint, it is significant that up to the forming of the first living beings, development of extracellular substances, it was significant that the first macromolecules could surround themselves with a protective cover so that inside, an environment could come into being that provided the condition for the survival of living beings (Maturana, H. R., & Varela, F. J., 1992).

A theory about the origins of this cellular membrane is as follows: If we could look at the ancient ocean, from the beginning of life, phospholipids and others were floating loosely on the surface. As they were impacted by raindrops, surface tension helped form a temporary membrane between them, before dissolving again when reentering the ocean. Through constant repetition of this event and others, more stable cell membranes developed. This is called the evolutionary principle of "shaping" (Maturana, H. R., & Varela, F. J., 1992). For the reader's reference, Thomas Brodbeck's movie The Evolution of Life, Thomas also provides insight into extracellular membrane origins. (Brodbeck, T., 1996).

Today, we understand it is this slowly stabilizing membrane that forms the precondition for control of biosynthesis, and guards our genetic inheritance. Between the phospholipid molecules on the surface of these cells, we find substances called "glycoproteins" which allow the cells to connect with other cells. These substances, specifically: murein, pectin, chitin, glycan, and cellulose, are found on the surface of bacteria, protozoa, yeasts, fungi and plants, and contribute considerably to the functions of the cells. Pischinger writes that these polymer sugar-protein compounds "form a molecular filter through which the whole of the metabolism has to pass forth and back" (Pischinger, 2010, p. 22).

So, while the fibroblasts form the center of the extracellular substance with a high activity of metabolism, the sugar coating of the cell, the so-called glycocalyx (Heine, 1997, p. 73), makes the evolution of behavior in multi-cellular organisms possible. This coating is essential for anchoring the cells within the extracellular substance as well as for the identification of the cell. For instance: immune defense cells develop a specific protective coating using lego-like building elements in order to attach to, and consequently eliminate, intruders such as bacteria (Heine, 1997).

Every organic function depends on the adequate composition and decomposition of the extracellular substance. The function of a molecular filter is tied to the rapid availability of as many different sugar surfaces of the cell membrane as possible. Heine (1997) writes:

> *Its structure in the DNA is not as strictly coded as the sequence of amino acids of a protein. Besides, there are many more possibilities of combinations as is the case with the twenty amino acids. The synthesized fundamental frame of the sugar-bio-polymers is only put in shape after being passed into the extracellular space by corresponding enzymes (….) This allows for great fluctuations of the micro composition of the proteo glycane/glycosaminoglycane (of the cell coats). In addition, spontaneous, self catalytic polymerization, de-polymerization and ring closures of the sugar chains come about (…) as well as bridge forming of ions and hydrogen with structure and linkage glycol proteins (Heine, 1997, p. 51).*

Karcher and Polthier describe these structures in different so called "hyperbolic space dividers" (Karcher and Polthier, 1990).

While giving and receiving sessions in Structural Integration both the practicioner and the client experiences a special effect melting in the tissue. This often is accompanied by a deep relaxation or an emotional liberation. In the past for this phenomenon we used the comparison of melting butter. This also

leads our thoughts to the change of amino acids in the tissue. Today we can illustrate graphically how the sugar-bio-polymer of the extracellular substance may alter by the sensitive touch of a body-worker – the melting experience of something between the cells of clients' skin becomes visible.

Let us appreciate here that many of these aspects of cell membrane research were not yet known when Ida Rolf, who started off as biochemist, developed her hypothesis about the change from the gel state to the sol state. Additionally, it was not possible at that time to illustrate graphically phenomena of structure components by computer-aided simulations. Is it possible that it is the organization of the sugar polymers in the extracellular substance that explains the bodyworking phenomena known as thixotropy?

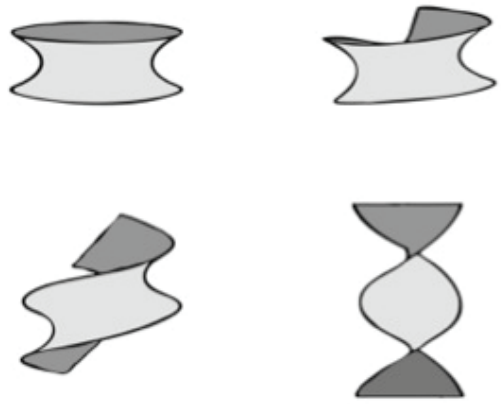

Figure 3, illustration of alteration of sugar-bio-polymer. Redrawn from an illustration of Heine, 1997, p. 55

Conclusions

With these insights, perhaps we have found a better understanding of those phenomena shown in Guimberteau's film from the beginning of this article. The graphical illustration of the alteration of sugar bio polymers may help us to understand what might be felt beneath our hands as practicing structural integrators. It could be the extracellular substance that is joined with the gland system via the capillaries and, with the central nervous system via peripheral nerve fibers, ending in the extracellular substance. Its qualities, its pH-value, its ability to alter the form of a cell surface, may is responsible for our immune reactions and the healing of tissue. And the thixotropy of the extracellular substance may offer us a new starting point to explain those phenomena experienced during a tissue treatment by touch.

I propose to the family of bodyworkers who carry on Ida Rolf's vision, that we orient our work toward 'the organ of our body structure'. Perhaps we can say that we deal professionally with the reactivation of this extracellular substance that is so essential to the whole of our health!

Only further research will show to what extent we have found an explanation for those impressive experiences for which our clients express their gratitude to us.

References

Asendorpf, J. B. (1996). Psychologie der Persönlichkeit. Grundlagen. Berlin: Springer.
Barnes, H. A. Thixotropie. (1997). Journal of Non-Newtonian Fluid Mechanics, 1 - 33.
Boyesen, G. (1987). Über den Körper die Seele heilen: biodynamische Psychologie und Psychotherapie : eine Einführung. München: Kösel.
Brodbeck, T. (Director). (1996). Die Evolution des Lebens Deutschland.
Dietrich, R. (2007). Die 5 Lebensweisen die 5 Charakterstrukturen der Bioenergetik ; Kurzfassung für Laien und Profis. Salzburg: Dietrich.
Diller, H. (1932). Die Überlieferung der Hippokratischen Schrift Peri aeron hydaton topon, volume 1, book 4.
Downing, G. (1972). The Massage Book. New York: Random House inc.
Goleman, D. (1995). Emotional Intelligence. New York: Bantam Books.

Guimberteau, J. (2010). Strolling Under the Skin, from http://www.youtube.com/watch?v=k6FaULbOmnE; Institut Aquitain d'Appareillage de la Main; 33600 Pessac, France.

Hei, K. (1990). Kiatsu: Heilung mit Ki. Leimen: Werner Kristkeitz Verlag.

Heine, H. (1997). Lehrbuch der Biologischen Medizin: Grundregulation und Extrazelluläre Matrix; Grundlagen und Systematik (2., u berarb. & #. ed.). Stuttgart: Hippokrates.

Ingraham, P. (2009). Thixotropy is Nifty, but it's Not Therapy. Updated 2013, from http://saveyourself.ca/articles/thixotropy-is-not-therapy.php

Jantsch, E. (1982). Die Selbstorganisation des Universums. München: Carl Hanser Verlag.

Juhan, D. (1987). Job's body: a Handbook for Bodywork. Barrytown, N.Y. Station Hill Press.

Karcher., & Polthier. (1990). Die Geometrie von Minimalflächen. Spektrum der Wissenschaft, 10, 96 - 107.

Kurtz, R. (1985). Körperzentrierte Psychotherapie: die Hakomi Methode (1. Aufl. ed.). Essen: Synthesis Verl.

Lowen, A. (2005). The Betrayal of the Body. Bioenergetics Press.

Maturana, H. R., & Varela, F. J. (1992). The Tree of Knowledge: the Biological Roots of Human Understanding, (Revised ed.) Boston: Shambhala.

Myers, T. (2001). Anatomy Trains. Livingston: Churchill Press.

Oschman, J.L., (1986). The Natural Science of Healing. A biology of whole systems.

Oschman, J. L. (2000). Energy Medicine: the scientific basis. Edinburgh: Churchill Livingstone.

Painter, J. (2011). Transformation of the Self with Bodymind Integration, Berlin, Hubert W. Holzinger Verlag.

Pischinger, A. (2010). Das System der Grundregulierung. Stuttgart: Karl F. Haug Verlag.

Kondepudi, Dilip; Prigogine, Ilya (1998). Modern Thermodynamics: From Heat Engines to Dissipative Structures. Wiley.

Reich, W. (1948). The Cancer Biopathy. Maine: Orgon Institute Press.

Reich, W. (1973). The Discovery of the Orgone. New York: Farrar, Straus and Giroux.

Reich, W. (1954). CORE (Cosmic Orgone Engineering) OROP Desert, Part 1: Space Ships, DOR & Drought. : Publications of the Orgone Institute.

Rolf, I. P., & Feitis, R. (1978). Ida Rolf talks about Rolfing and Physical Reality. New York: Harper & Row.

Rywerant, Y. (1983). The Feldenkrais method: teaching by handling: a technique for individuals. San Francisco: Harper & Row.

Schlage, B. (1995). The spirit of touch – different layers of contact in bodywork. October 1995. A talk at the VIIeme congres international de somatherapie, San Francisco.

Schlage, B. (2010). Teaching material for the training in Postural Integration.

Schlage, B. (2012). Blanche Wittmanns Busen und ärztlicher Hochdruck. Energie und Charakter, 35, 67 – 77, CH-Bühler: Orgon Verlag.

Schleip, R. (2006). Active Fascial Contractibility. Ulm: Ulm University.

Schleip, R. (2012). Fascia as a sensory organ. A target of myofascial manipulation. Book Chapter in: Dalton, E (2012) Dynamic Body – Exploring Form, Expanding Function. Oklahoma City, OK: Freedom from Pain Institute, 137 - 163.

Schwind, P. (1985). Rolfing. München: Goldmann Verlag.

Sharaf, M. R. (1983). Fury on earth: a biography of Wilhelm Reich. New York: St Martin's Press/Marek.

Varela, F. (1987) The organ of form: toward a theory of biological shape. Journal of social biological structure, 10, 72 – 83, Academic Press London.

Wilber, K. (2000). Integral Psychology: Consciousness, Spirit, Psychology, Therapy. Boston: Shambhala.